

Letter to the Editor: "Bone Pain Palliation With Strontium-89 in Children"

We read with interest the article by M. Charron et al. entitled "Pain Palliation with Strontium-89 in Children with Metastatic Disease," published in *Medical and Pediatric Oncology* in June 1996 [1]. Strontium-89 (89 Sr), a beta emitting radioisotope with a specific uptake in bone, is generally employed for the palliation of metastatic bone pain in prostatic or breast cancers. The article reports the first cases of using 89 Sr in two children.

One patient had metastatic pulmonary carcinoma but only minimal increased uptake on bone scan. The authors recognize that the biodistribution of strontium is similar to 99mTc-MDP, thus, the failure of the treatment was predictable in that case.

The other patient was an 11-year-old boy with a stage IV neuroblastoma. Neuroblastoma is among the most common malignant neoplasms in childhood [2]. Since the early 1980s, the detection of neuroectodermally derived tumors has been greatly facilitated by the introduction of meta-iodobenzylguanidine (MIBG), an aralkyl-guanidine noradrenaline analogue [3,4]. Once iodinated with I-131 or I-123, mIBG has been shown to be highly sensitive (90–95%) and specific (100%) for the localization of neuroblastoma lesions [5]. Furthermore, the great majority of authors claim that mIBG scintigraphy is more sensitive than bone scan for the detection of osseous and bone marrow involvements in neuroblastoma [6,7].

The high tumor affinity allows the therapeutic use of the 131I labelled mIBG [8]. The effectiveness of the treatment of neuroblastoma with 131I-mIBG is not only on bone pain palliation, like bone-seeking beta-emitting radionuclides such as 89 Sr, but encouraging results in term of partial or complete remission were reported in many clinical trials [9–12].

As mIBG is now widely available and commonly used, this exam, which reveals skeletal as well as soft tissue involvements, should be first performed in the diagnosis and follow-up of neuroblastoma. In the same manner, the potentiality of mIBG therapy in term of subjective as well as objective effects, should be better explored in neuroblastoma patients.

Therefore, even if the article [1] reports the first use of 89 Sr in children, the utility of the administration of that radioactive compound is questionable in both cases.

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Reply

We thank Drs. Giammarile and Chauvot for their interest in our paper, and for their review of the basics of nuclear medicine physics. We would like, however, to emphasize some features that were overlooked. From a radiation protection perspective iodine-131 is significantly more tedious to handle, and thus potentially more noxious than strontium-89; this is illustrated in the United States by stringent regulations that require patients who receive iodine-131 to be hospitalized when the dose of iodine-131 delivered is above 30 millicurie.

There are no such limitations or regulations with strontium-89 and thus patients can be released immediately. Side effects and complications of MIBG- I^{131} are also more severe; hematological toxicity continues to represent a limiting factor [1] especially in children with extensive bone marrow metastasis in whom bone marrow depression can be severe [2]. A recent study disclosed that MIBG- I^{131} had a sensitivity of only 50% for depiction of site of relapse [3]. Therefore one could predict that the therapeutic response would be even less in this group of patients. In terms of the efficacy of MIBG as a therapeutic agent, out of 95 patients reported in six different studies [4–9] only five had a complete response and 16 a partial response. In virtually all these patients bone marrow toxicity was observed and in some was manifested as severe thrombocytopenia (platelet level less than 25,000 per μ L), and occasionally marked leukopenia was also present. A few patients developed renal and liver toxicity. Recently, a case report of hepatic necrosis was added to the list of complications [10]. Conversely, strontium-89 has been documented, in many prospective multi-center clinical trials, to be efficacious for pain palliation in adults with metastatic bone disease. The next logical step was thus to use this agent in children with metastatic disease to the bone. This was our goal and we intend to use it again in a prospective clinical trial in children with other neoplasia known to metastasize to the bone such as osteosarcoma, Ewing sarcoma and other tumors. We are puzzled that Drs. Giammarile and Chauvot question the utility of strontium-89 when we reported a successful outcome. Additionally, this child had lung cancer, and MIBG has no affinity for this neoplasm. In our opinion, it is counterproductive to be reluctant to accept a new treatment modality, regardless of what else is available. MIBG- I^{131} is not available for therapeutic use in the United States. The efficacy of MIBG- I^{131} is dubious and whether it will improve the prospect of cure remains to be seen [11]. Until MIBG- I^{131} is well accepted by the medical community, is

readily available and is part of the armamentarium available to the physician, strontium-89 remains a better agent for palliation of pain in children and adults with metastatic bone disease.

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